

## CLAIMS

1.     A method for time synchronizing a second base station with a first  
2     base station comprising:  
       measuring a round trip delay interval of transmissions from the  
4     first base station to a mobile station in communication with the first base  
       station and back from the mobile station to the first base station;  
6     receiving at the second base station communications transmitted by  
       the mobile station and noting the time of reception;  
8     determining an estimate of a delay which occurs between  
       transmission by the mobile station and reception by the second base  
10    station; and  
       computing a timing correction value in accordance with said  
12    estimate of the delay, said noted time of reception, and said measured  
       round trip delay interval.
2.     The method of claim 1 further comprising receiving at the second  
2     base station a message indicative of the identity of the mobile station to assist the  
       second base station in said receiving communications from the mobile station.
3.     The method of claim 2 further comprising sending the message  
2     indicative of the identity of the mobile station from the first base station to the  
       second base station.
4.     The method of claim 3 wherein said sending the message from the  
2     first base station to the second base station comprises:

4 sending the message from the first base station to the second base station  
via a base station controller in communication with the first base station and the  
second base station.

2 5. The method of claim 3 wherein said sending the message from the  
first base station to the second base station comprises:

4 receiving at the first base station communications from a plurality of  
mobile stations;

6 selecting a mobile station most likely to be able to communicate with the  
second base station; and

sending the message indicative of the identity of the mobile station.

2 6. The method of Claim 5 wherein said selecting a mobile station most  
likely to be able to communicate with the second base station comprises:

selecting a mobile station furthest from the first base station.

2 7. The method of Claim 5 wherein said selecting a mobile station most  
likely to be able to communicate with the second base station comprises:

selecting a mobile station closest from the first base station.

2 8. The method of Claim 5 wherein said selecting a mobile station most  
likely to be able to communicate with the second base station comprises:

4 selecting a mobile station in accordance with the state of a PN spreader in  
the mobile station.

9. The method of claim 5 wherein said selecting a mobile station most  
2 likely to be able to communicate with the second base station comprises:  
selecting a mobile station in accordance with the sector of the first base  
4 station being used for communication with the mobile station.

10. The method of claim 5 wherein said selecting a mobile station most  
2 likely to be able to communicate with the second base station comprises:  
selecting a mobile station in accordance with said measured round trip  
4 delay interval.

11. An apparatus for time synchronizing a second base station with a  
2 first base station comprising:  
a first base station configured to:  
4 measure a round trip delay interval of transmissions from said first  
base station to a mobile station in communication with said first base  
6 station and back from the mobile station to said first base station; and  
a second base station configured to:  
8 receive communications transmitted by the mobile station and  
noting the time of reception;  
10 determine an estimate of a delay which occurs between  
transmission by the mobile station and reception by said second base  
12 station; and  
compute a timing correction value based upon the estimate of the  
14 delay, the time of reception, and the measured round trip delay interval.

12. The apparatus of claim 11 wherein said second base station is  
2 further configured to receive a message indicative of the identity of the mobile

station to assist said second base station to receive communications from the  
4 mobile station.

13. The apparatus of claim 12 wherein said first base station is further  
2 configured to send the message indicative of the identity of the mobile station to  
said second base station.

14. The apparatus of claim 13 wherein said first base station is further  
2 configured to send the message to said second base station via a base station  
controller in communication with said first base station and said second base  
4 station.

15. The apparatus of claim 13 wherein said first base station is further  
2 configured to:  
receive communications from a plurality of mobile stations; and  
4 select a mobile station most likely to be able to communicate with said  
second base station.

16. The apparatus of Claim 15 wherein said first base station is  
2 configured to select the mobile station most likely to be able to communicate  
with said second base station as a mobile station furthest from said first base  
4 station.

17. The apparatus of Claim 15 wherein said first base station is  
2 configured to select the mobile station most likely to be able to communicate  
with said second base station as a mobile station closest from said first base  
4 station.

18. The apparatus of Claim 15 wherein said first base station is  
2 configured to select the mobile station most likely to be able to communicate  
with said second base station in accordance with the state of a PN spreader in the  
4 mobile station.

19. The apparatus of claim 15 wherein said first base station is  
2 configured to select the mobile station most likely to be able to communicate  
with said second base station in accordance with the sector of said first base  
4 station being used for communication with the mobile station.

20. The apparatus of claim 15 wherein said first base station is  
2 configured to select the mobile station most likely to be able to communicate  
with said second base station in accordance with said measured round trip delay  
4 interval.

21. A method for synchronizing a base station with a wireless  
2 communication system upon the base station's power up, comprising:  
disabling a transmission from the base station;  
4 obtaining initial timing at the base station.

22. The method of claim 21 wherein said obtaining initial timing at the  
2 base station comprises:  
obtaining initial timing at the base station in accordance with a timing  
4 signal provided from a base station controller.

23. The method of claim 21 wherein said obtaining initial timing at the  
2 base station comprises:

obtaining initial timing at the base station in accordance with a timing  
4 signal provided over a backhaul.

24. The method of claim 21 wherein said obtaining initial timing at the  
2 base station comprises:

obtaining initial timing at the base station in accordance with a timing  
4 signal provided from a WWW receiver.

25. The method of claim 21 wherein said obtaining initial timing at the  
2 base station comprises:

obtaining initial timing at the base station in accordance with an  
4 intermittent timing signal.

26. The method of claim 21 further comprising:

receiving at the base station signals transmitted from a mobile station; and  
adjusting timing of the base station in accordance with said received  
4 signals.

27. The method of claim 26 wherein said receiving at the base station  
2 signals transmitted from a mobile station comprises:

providing to the base station information about identity of the mobile  
4 station;

estimating at the base station distance to the mobile station; and

6 receiving at the base station signals transmitted from the mobile station in  
accordance with said provided information and said estimated distance.

28. The method of claim 27 wherein said estimating at the base station  
2 distance to the mobile station comprises:  
estimating at the base station time delay to the mobile station.

29. The method of claim 27 wherein said estimating at the base station  
2 distance to the mobile station comprises:  
assuming that the mobile station is located adjacent to the base station

30. The method of claim 27 wherein said estimating at the base station  
2 distance to the mobile station comprises:  
estimating at the base station distance to the mobile station in accordance  
4 with a round trip delay interval of transmissions from a first base station to the  
mobile station in communication with the first base station and back from the  
6 mobile station to said first base station.

31. The method of claim 27 wherein said estimating at the base station  
2 distance to the mobile station comprises:  
estimating at the base station distance to the mobile station in accordance  
4 with:

a first round trip delay interval of transmissions from a first base  
6 station to the mobile station in communication with the first base station  
and back from the mobile station to the first base station; and

8 a second round trip delay interval of transmissions from a second  
base station to the mobile station in communication with the second base  
10 station and back from the mobile station to the second base station.

2 32. The method of claim 26 wherein adjusting timing of the base  
station in accordance with said received signals comprises:

4 adjusting timing of the base station in accordance with a time offset  
between an estimated PN offset of the mobile station and an actual PN offset of  
the mobile station.

2 33. The method of claim 26 further comprising:  
providing the mobile station with an identity of the base station; and  
4 transmitting signals at successively increasing power levels from the base  
station in accordance with said adjusted timing until the mobile station detects  
said transmitted signals.

2 34. The method of claim 33 wherein said providing the mobile station  
with an identity of the base station comprises:  
providing the mobile station with a pilot PN code offset.

2 35. The method of claim 33 wherein said providing the mobile station  
with an identity of the base station comprises:  
providing the mobile station with a pilot PN code.

2 36. The method of claim 33 further comprising:  
synchronizing timing of the base station with at least one base station  
communicating with the mobile station.

2 37. The method of claim 36 wherein said synchronizing timing of the  
base station with at least one base station communicating with the mobile station  
comprises:



4           initiating a communication between the base station and the mobile  
station;

6           measuring a first round trip delay interval of transmissions from the base  
station to the mobile station in communication with the base station and back  
8           from the mobile station to the base station;

              measuring a second round trip delay interval of transmissions from the at  
10          least one base station communicating with the mobile station and back from the  
mobile station to the at least one base station communicating with the mobile  
12          station;

              measuring at the mobile station a time difference between the time of  
14          receipt of a transmission from the at least one base station communicating with  
the mobile station and the time of receipt of a transmission from the base station  
16          communicating with the mobile station; and

              computing a timing correction value based upon, said measured first  
18          round trip delay interval, said measured second round trip delay interval, and  
said measured time difference.

38.       The method of claim 36 further comprising:

2           repeating said synchronizing timing of the base station with at least one  
base station communicating with the mobile station for all mobile stations within  
4           the coverage area of the base station.

39.       The method of claim 36 wherein synchronizing timing of the base  
2          station with at least one base station communicating with the mobile station  
comprises the method as claimed in claim 1.

2 40. A apparatus for synchronizing a base station with a wireless  
communication system upon the base station's power up, comprising:  
a transmitter;  
4 a processor communicatively coupled to said transmitter; and  
a storage medium coupled to said processor and containing a set of  
6 instructions executable by said processor to:  
disable said transmitter; and  
8 obtain initial timing.

2 41. The apparatus of claim 40 wherein said processor obtains initial  
timing by executing a set of instructions to:  
obtain initial timing in accordance with a timing signal provided from a  
4 base station controller.

2 42. The apparatus of claim 40 wherein said processor obtains initial  
timing by executing a set of instructions to:  
obtain initial timing in accordance with a timing signal provided over a  
4 backhaul.

2 43. The apparatus of claim 40 wherein said processor obtains initial  
timing by executing a set of instructions to:  
obtain initial timing in accordance with a timing signal provided from a  
4 WWW receiver.

2 44. The apparatus of claim 40 wherein said processor obtains initial  
timing by executing a set of instructions to:  
obtain initial timing in accordance with an intermittent timing signal.

45. The apparatus of claim 40 further comprising:

2 a receiver, communicatively coupled to said processor, configured to  
receive signals transmitted from a mobile station; and wherein  
4 said processor executes a set of instructions to:  
adjust timing of the base station in accordance with the received  
6 signals.

46. The apparatus of claim 45 wherein said processor further executes a  
2 set of instructions to:

obtain information about identity of the mobile station; and  
4 estimate a distance from the base station to the mobile station; and  
wherein the receiver is further configured to:  
6 receive signals transmitted from the mobile station in accordance  
with the provided information and the estimated distance.

47. The apparatus of claim 46 wherein said processor estimates a  
2 distance from the base station to the mobile station by executing a set of  
instructions to:

4 estimate a time delay between the base station and the mobile station.

48. The apparatus of claim 46 wherein said processor estimates a  
2 distance from the base station to the mobile station by executing a set of  
instructions in accordance with an assumption that the mobile station is located  
4 adjacent to the base station.

49. The apparatus of claim 46 wherein said processor estimates a  
2 distance from the base station to the mobile station by executing a set of  
instructions to:

4 estimate distance from the base station to the mobile station in accordance  
with a round trip delay interval of transmissions from a first base station to the  
6 mobile station in communication with said first base station and back from the  
mobile station to said first base station.

50. The apparatus of claim 46 wherein said processor estimates a  
2 distance from the base station to the mobile station by executing a set of  
instructions to:

4 estimate a first round trip delay interval of transmissions from a first base  
station to the mobile station in communication with said first base station and  
6 back from the mobile station to said first base station; and

estimate a second round trip delay interval of transmissions from a second  
8 base station to the mobile station in communication with said second base station  
and back from the mobile station to the second base station.

51. The apparatus of claim 45 wherein said processor adjusts timing of  
2 the base station in accordance with said received transmission by executing a set  
of instructions to:

4 adjust timing of the base station in accordance with a time offset between  
an estimated PN offset of the mobile station and an actual PN offset of the mobile  
6 station.

52. The apparatus of claim 45 further comprising:

- 2           a mobile station configured to obtain information about identity of the  
base station; and
- 4           said transmitter configured to transmit signals at successively increasing  
power levels from the base station in accordance with the adjusted timing until
- 6           the mobile station detects the transmitted signals.

53.    The apparatus of claim 52 wherein the mobile station is configured  
2    to obtain information about a pilot PN code offset of the base station.

54.    The apparatus of claim 52 wherein the mobile station is configured  
2    to obtain information about a pilot PN code of the base station.

55.    The apparatus of claim 45 said processor further executes a set of  
2    instructions to synchronize timing of the base station with at least one base  
station communicating with said mobile.

56.    The apparatus of claim 45 wherein said processor synchronizes  
2    timing of the base station with at least one base station communicating with the  
mobile station by executing a set of instructions to:

4           initiate a communication between the base station and the mobile station;  
          measure a first round trip delay interval of transmissions from the base

6    station to the mobile station in communication with the base station and back  
from the mobile station to the base station;

8           measure a second round trip delay interval of transmissions from the at  
least one base station communicating with the mobile station and back from the

10   mobile station to the at least one base station communicating with said mobile;  
and

12           compute a timing correction value in accordance with the first round trip  
delay interval, the second round trip delay interval, and a time difference  
14   provided by the mobile station; and wherein  
the mobile station is configured to:  
16           measure the time difference between the time of receipt of a  
transmission from the at least one base station communicating with the  
18   mobile station and the time of receipt of a transmission from the base  
station.

57.   The apparatus of claim 54 wherein said processor repeats said  
2   synchronizing timing of the base station with at least one base station  
communicating with the mobile station for all mobile stations within the  
4   coverage area of the base station.

58.   The apparatus of claim 54 wherein further comprises the apparatus  
2   as claimed in claim 11.